25. Hostetter TH, Rennek HG, Brenner BM. The case for intrarenal hyper-
tension in the initiation and progression of diabetic and other glomerulo-

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SHORT REPORTS

Successful completed pregnancy in a patient maintained on home parenteral nutrition

Total parenteral nutrition is an accepted treatment for intestinal failure resulting from conditions such as short bowel or extensive Crohn's disease.1 The effect of total parenteral nutrition on human pregnancy is not well documented. Heller2 cites hyperemesis gravidarum as an indication for short-term total parenteral nutrition but considers that lipid emulsions are contraindicated because of effects on the placenta. There have been several isolated reports of total parenteral nutrition in the third trimester, either in hospital2 4 or at home,5 but we do not know of any previous instance of a pregnancy maintained from conception to delivery in a patient nourished entirely by parenteral nutrition.

Case report

A 31 year old woman was referred to the nutrition unit at Hope Hospital, Salford, in June 1981 with a six year history of severe abdominal pain whenever she ate. In addition she was amenorrhoeic. Barium studies showed extensive small-bowel Crohn's disease unsuitable for surgery. Intensive medical treatment had failed to prevent frequent admissions to hospital. Severe weight loss (down to a minimum of 28 kg) and weakness resulted in her being confined to a wheelchair. Total parenteral nutrition was started with considerable symptomatic relief and pronounced weight gain. She was referred to our unit for training in home parenteral nutrition.

On admission she weighed 41.8 kg (76% of ideal weight for height). Resting energy expenditure was measured by indirect calorimetry using a Beckman metabolic cart. A Broviac catheter was positioned in the superior vena cava. The patient was trained to administer her own parenteral nutrition as a nighttime infusion. Her initial daily regimen provided 14 g nitrogen (Synthamin, Travenol Laboratories) and 7.5 MJ (1800 kcal), half as dextrose and half as lipid emulsion (Intralipid, KabiVitrum). Trace elements and vitamins were added to the infusate.

The patient was discharged in August 1981, to continue home parenteral nutrition: her weight at discharge was 53.4 kg (97% of ideal). Iron and folate were given by mouth, and vitamin B12 by monthly intramuscular injections. She remained free of pain provided she did not eat at all and restricted her fluid intake. She was able to lead an essentially normal life at home and care for her family unaided. The amenorrhoea persisted.

By October 1981, her weight had risen to 57 kg (104% of ideal for her height). This was thought to be due to excessive energy provision, therefore her energy intake was reduced to 4.2 MJ (1000 kcal) per day. In March 1982, the patient and her medical advisors realised she was pregnant. Ultrasound scan confirmed a normal fetus; she had conceived about mid October 1981. The patient now weighed 58 kg and had a resting energy expenditure of 6 MJ (1400 kcal) per day, and vitamin B12 was increased to 10 MJ (2400 kcal) per day, with lipid emulsion providing about 18% of the energy. The pregnancy progressed normally, monitored by weekly assessment of maternal weight gain, ultrasound, and serial estimations of plasma oestriol, human placental lactogen, and urine concentrations (table). In the 37th week she had a normal vaginal delivery of a healthy girl, weighing 2.62 kg. The head circumference and length were on the 50th centile for 37 weeks and the 90th centile for 40 weeks. Weight was only about the 20th centile for 37 weeks and below the 10th centile for 40 weeks.

Histological examination of the placenta showed it to be normal with no evidence of lipid thrombi or deposition.

Comment

Patients with Crohn's disease and severe malnutrition are often amenorrhoeic and subfertile. Though home parenteral nutrition was effective in correcting malnutrition and restoring a high quality of life in this case it did not affect the amenorrhoea. Our main problem was a total lack of information on intravenous nutritional requirements in pregnancy. We were able to measure direct the requirements for amino acids and energy, but the need for minerals, trace elements, and vitamins was more difficult to determine. Our ultimate dosage regimen was only marginally different from that given to normal patients during pregnancy.

Despite Heller's assertions2 that fat emulsions are contraindicated in pregnancy, neither patient nor baby showed ill effects from administration of lipids. Similarly, Heller's suggestion that intravenous fat emulsion may induce premature labour is not borne out by this case.

The low birth weight of the baby may be a result of inadvertent temporary reduction in energy intake during early pregnancy when an increase would have been more appropriate. Our experience has shown that home parenteral nutrition is capable of maintaining a normal pregnancy from conception to delivery. The patient described spent only four days in hospital (for assessment) throughout her pregnancy.

We thank Dr D Shreve for referring this patient; Sister G McCannon, Dr I Holbrook, Mrs K Shipley, Dr J Shaffer, Miss C Clark, and the MRC Trauma Unit for their help in managing this case.


Measurements recorded during monitoring of pregnancy

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<th>Gestation (wks)*</th>
<th>Patient's weight (kg)</th>
<th>Plasma oestriol (nmol/l)</th>
<th>Plasma human placental lactogen (mg/l)</th>
<th>Plasma urate (mmol/l)</th>
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*Gestational age assessed by fetal biparietal diameter on ultrasound scan.

Normal range of values: Oestriol: 1 mmol/l = 28.8 ng/100 ml. Urate: 1 mmol/l = 17 mg/100 ml.
Successful pregnancy in a renal transplant recipient taking cyclosporin A

There have been several reported successful pregnancies in renal transplant recipients receiving conventional immunosuppressive agents. A recent multicentre trial, however, suggested that cyclosporin A is more effective than conventional immunosuppression in these patients.1 We report the first case of a pregnancy in a renal transplant recipient taking cyclosporin A as the only immunosuppressive agent.

Case report
A 27 year old patient had a successful renal transplant operation in February 1981 when treated with cyclosporin A. Two previous transplant operations in 1977 and 1979 with conventional immunosuppression had failed. She conceived in November 1981 when receiving cyclosporin A 450 mg daily, which was continued at the same dose throughout the pregnancy. She remained normotensive with no proteinuria. Concentrations of serum creatinine (mean 98.5; SD 60 μmol/l; 1:1 SD 0.1 mg/100 ml) and urea (mean 7.8: SD 1.5 mmol/l; 46:7: SD 9.2 mg/100 ml) remained stable, and the white cell count (mean 7.4: SD 1.3×10⁹/l) and platelet count were within normal limits. Haemoglobin concentration varied between 9.6 and 12.2 g/dl.

Serial ultrasound cephalometry confirmed satisfactory fetal growth, and regular fetal heart tracings were normal. A placental lactogen estimation at 33 weeks of gestation was 9.4 mg/l, but serial 24 hour urinary oestriol estimations carried out from 32 weeks were persistently below normal limits. Labour was induced at 38 weeks of pregnancy and a healthy boy weighing 2980 g delivered vaginally. The fetal heart rate remained stable throughout labour, and the Apgar score at five minutes was 9. The baby had a haemoglobin concentration of 15.9 g/dl and a white cell count of 23-4:10³/μl, and careful clinical examination showed no hirsutism or congenital abnormality. Bilirubin concentration did not rise above 155 μmol/l (9.1 mg/100 ml) and aspartate transaminase activity was normal (56 IU/l). The patient was advised against breast feeding because of the possible transfer of cyclosporin A into the breast milk. Mother and baby were allowed home on the seventh postpartum day.

Cyclosporin A was not detected in samples of liquor obtained at amniocentesis at 36 weeks and at amniotomy, but this was not surprising given the very low water solubility of the drug. The drug was present in the maternal and cord blood at delivery in concentrations of 86 and 54 μg/l, respectively. Cyclosporin A was also detected in samples of breast milk obtained on days 2 (101 μg/l), 3 (109 μg/l), and 4 (263 μg/l) post partum. Maternal blood samples were not taken simultaneously with the milk samples, however, so that we could not calculate the distribution ratio between blood and milk.

Comment
Reports indicate that women with a well functioning renal transplant have a reasonable chance of delivering a healthy infant. There is, however, a small risk of congenital abnormality and fetal adrenal suppression when the mother is taking steroids and azathioprine.2 The fungal peptide cyclosporin A has a selective action against T cells, particularly those concerned in allograft rejection, and reports on the use of the drug in clinical renal transplantation have confirmed its beneficial immunosuppressive properties.3

Studies in animals have not shown any teratogenicity of cyclosporin A, and the results in our case confirm that although the drug crossed the placenta there was no evidence of immunosuppression or congenital abnormality in the baby.

Interestingly, urinary oestriol concentrations were persistently low while other parameters of fetal wellbeing were satisfactory. This has been reported in other renal transplant recipients and was presumed to be due to fetal adrenal suppression caused by steroid administration to the mother. We found that oestriol concentrations in urine specimens of other pregnant women were reduced when mixed with urine from patients taking cyclosporin A, thus indicating that this drug does not interfere with urine oestriol determinations. The low urinary oestriol excretion in pregnant renal transplant recipients may therefore be due to a relatively lower glomerular filtration rate.

Studies in animals show that cyclosporin A is excreted in breast milk in a maximum amount of 2% of the maternal dose (M Lemaire, unpublished Sandoz internal document, 1982), and this was confirmed by the detection of appreciable quantities of the drug in the breast milk of our patient. We therefore suggest that mothers taking cyclosporin A should avoid breast feeding.

Our findings suggest that we can reasonably optimistic about the outcome of pregnancy in patients with a well functioning renal transplant receiving cyclosporin A, and because there is no evidence of teratogenicity cyclosporin A may be the drug of choice in renal transplant recipients contemplating pregnancy. We recommend that patients should avoid pregnancy for two years after transplantation because of the increased risk of graft rejection during this period, and more than two years patients will have reached their lowest immunosuppressive maintenance doses.

Carbon monoxide poisoning in a former mining community

Many accidental cases of carbon monoxide poisoning result from the incomplete combustion of household gas.1 We describe an unusual cause of carbon monoxide intoxication affecting several elderly neighbours in a former mining town.

Case histories
Case 1—A 72 year old woman complained of lassitude on the day before she was found by neighbours in a semiconscious state. Her condition rapidly improved in hospital, and subsequent analysis of her blood showed 35% saturation of haemoglobin by carbon monoxide.

Case 2—A 64 year old woman, who lived in the neighbouring bungalow to the patient in case 1, was admitted to hospital on the same day. Also found unconscious, she was pale with flaccid limbs and several skin vesicles at pressure sites. Cerebrospinal fluid was normal, but an electrocardiograph showed transient T wave inversion. Carboxyhaemoglobin concentration was 50%. Signs of extrapyramidal rigidity developed, and she died of broncho-pneumonia four months later. At necropsy ischaemic cerebral softening was particularly severe in the basal ganglia.